1. A method for estimating the bit-error-ratio (BER) within an optical communications network via which a multiplicity of information-carrying data bits are transmitted over an optical medium, each of the multiplicity of information-carrying data bits being designated in nomenclature as either ones or zeros, the method comprising the steps of:

extracting a sequence containing a finite number of the data bits from among that multiplicity of information-carrying data bits;

transmitting the sequence to a decision circuit capable of discriminating the finite number of data bits as either ones or zeros as a function for a threshold value;

setting the threshold value;

counting at least a number of ones and a number of zeros associated with the finite number of data bits in the sequence at the threshold value;

repeating the steps of setting the threshold value and counting at least the number of ones and the number of zeros associated with the finite number of data bits in the sequence at the threshold value for a plurality of different threshold values to establish a plurality of data sets, each data set reflecting at least the number of ones and the number of zeros measured as corresponding to the threshold value; and

estimating an optical BER value by performing a Q-fitting algorithm on the plurality of data sets.

2. The method of claim 1 wherein the Q-fitting algorithm is characterized by the formula

$$BER(v_i) = \frac{1}{2}\left\{erfc\left(\frac{|\mu_1 - v_i|}{\sigma_1}\right) + erfc\left(\frac{|\mu_0 - v_i|}{\sigma_0}\right)\right\}$$

wherein *erfc* represents a complementary error function, μ_1 and μ_0 represent mean values, and σ_1 and σ_0 represent standard deviations.

3. The method of claim 2 wherein the complementary error function is expressed by the formula

$$erfc(x) = \frac{1}{\sqrt{2\pi}} \int_{x}^{\infty} e^{-2\beta 2/2} \partial\beta .$$

4. The method of claim 3 wherein the complementary error function is approximately equal to

$$\frac{1}{x\sqrt{2\pi}} e^{x2/2} .$$

5. The method of claim 1 wherein at least the step of extracting a sequence containing a finite number of the data bits from among that multiplicity of information-carrying data bits is performed synchronously.

6. The method of claim 1 wherein the steps are preformed synchronously.

7. The method of claim 1 wherein at least the step of extracting a sequence containing a finite number of the data bits from among that multiplicity of information-carrying data bits is performed asynchronously.

8. The method of claim 1 wherein the steps are preformed asynchronously.